ABSTRACT

The present invention has been made for providing a photonic crystal capable of multiplexing or demultiplexing light within a wavelength band having a certain width. It includes a slab-shaped body 21 provided with plural forbidden band zones 211 and 212, and holes 221 and 222 having different sizes are arranged in the forbidden band zones with different cycles, respectively. Also formed are a trunk waveguide 24 extending along the direction inclined by +30 degrees from a perpendicular of the boundary 23 between the forbidden band zones 211 and 212, and a branch waveguide 25 extending along the direction inclined by −30 degrees. A ray of light within the multiplexed/demultiplexed wavelength band, which is excluded from the transmission wavelength band of the trunk waveguide 24 in the forbidden band zone 212 and included in the transmission wavelength band of the trunk waveguide 24 in the forbidden band zone 211, is reflected by the boundary 23 and thereby demultiplexed from the trunk waveguide 24 into the branch waveguide 25. Thus, all the rays of light whose wavelengths are within the multiplexed/demultiplexed wavelength band having a certain width are demultiplexed into the branch waveguide 25. Therefore, even if the wavelength of the optical signal is deviated due to some error, the light can be demultiplexed. This is also true for the multiplexing operation.